

Venereal Disease Among Teen-Agers

—*Its Relationship to Juvenile Delinquency*—

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LIMITATION of funds and personnel for venereal disease control has made it necessary to pinpoint insofar as possible the segments of the population in which venereal disease occurs most often and to which epidemiology can most effectively and profitably be applied. With this major objective, a project was initiated to collect morbidity data by age since up to this time only scattered information was available as to the age composition of reported cases.

With increasing attention being given to problems of youth, such data would also provide an opportunity to study the venereal disease problem among teen-agers. In addition, it was deemed important to determine the relative frequency of reported venereal disease among young adults as compared to older persons. It was anticipated that the findings from the analysis of these data would greatly increase our knowledge of the venereal disease problem, improve our case-finding efficiency, and heighten the accuracy of our estimates of the incidence and prevalence of syphilis and gonorrhea.

Mr. Donohue is chief statistician and Mrs. Gleeson, Mr. Jenkins, and Mrs. Price are statisticians in the Venereal Disease Program, Division of Special Health Services, Public Health Service. This paper is based on morbidity data furnished by State and city health departments.

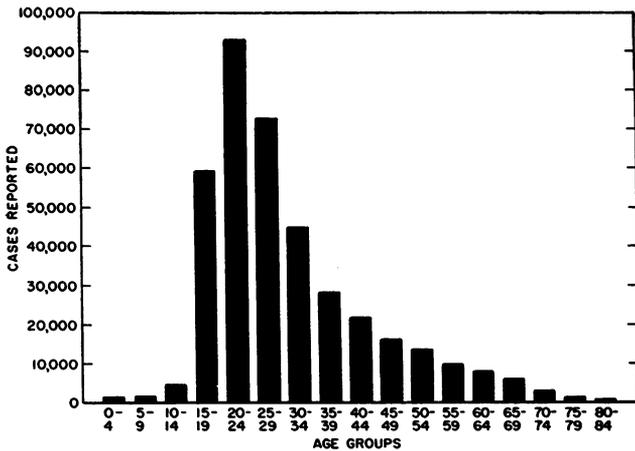
Morbidity reports routinely submitted by State and city health departments indicate the number of cases reported by disease, stage of disease, race, sex, and reporting source, but do not provide any information relating to age. Reporting areas were therefore requested to prepare a special report of venereal disease cases by single years of age for all syphilis and gonorrhea cases reported in the calendar year 1953.

Response to this request was quite gratifying. Only one State and one large city were not able to submit tabulations by age. In terms of total cases, based on routine morbidity reports, 83 percent of syphilis cases and 77 percent of gonorrhea cases were reported by individual year of age. For purposes of this study, cases of unknown age have been prorated on the basis of known age distributions.

This report, the first to be published on this study, will consider in general that portion of the venereal disease problem which occurs among persons under 20 years of age and will relate these data to juvenile delinquency and other problems of youth.

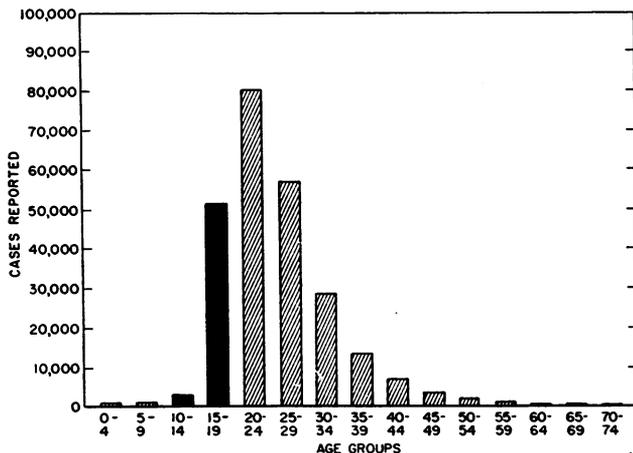
Figure 1 shows the general pattern of the age distribution of the total cases of syphilis (all stages) and gonorrhea in the United States by 5-year age groups. A glance at the chart shows that the curve is peaked at the 20–24 year age group and is skewed to the right. The abrupt increase in cases at ages 15–19 years indicates how very serious the venereal disease problem is after age 14.

Figure 1. Total cases of syphilis and gonorrhea reported in continental United States for the calendar year 1953, by age.



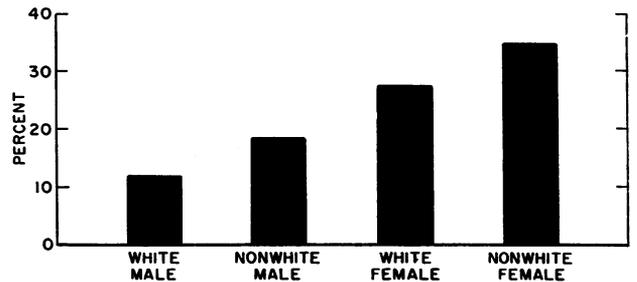
Epidemiology and the principles of preventive medicine can be applied most productively to the infectious stages of venereal disease. Figure 2 shows the age distribution of primary and secondary syphilis and gonorrhea by 5-year age groups. A higher proportion of the venereal disease cases in this chart are in the younger age groups than in figure 1 since syphilis cases of long duration are excluded. The chart represents the age distribution of fresh cases of venereal infections. Again there is a sharp increase in cases in the group aged 15-19 years.

Figure 2. Cases of primary and secondary syphilis and gonorrhea reported in continental United States in the calendar year 1953, by age.



It will be noted from table 1 that 22.4 percent of infectious venereal disease in the United States is reported among persons under 20 years of age. The proportion that infectious venereal disease is of the total syphilis and gonorrhea reported at any given year of age is also shown in table 1. It will be observed that this percentage increases from age 11 to a maximum at age 18 and then gradually decreases with age. Although this percentage represents all infectious venereal disease, it is believed that most of the infections at age 10 and below were probably acquired innocently.

Figure 3. Percentage of total cases of infectious venereal disease reported among persons under 20 years of age, by race and sex.



Infectious Venereal Disease Under Age 20

Infectious venereal disease is diagnosed more often among males than among females because of more obvious signs or painful symptoms in the male. However, blood testing surveys have shown that both sexes have equal syphilis prevalence rates. Another factor which must be considered is the very significant difference in both incidence and prevalence of venereal disease between whites and nonwhites. In analyzing the relative frequency of infectious venereal disease reported among teen-agers we must compare the number of cases under age 20 in each race-sex group with the total number of cases for that group to demonstrate how the percentage of infectious venereal disease under age 20 varies among the four race-sex groups.

Figure 3 shows how the percentage of infectious venereal disease in persons under age 20 varies with sex and race. The proportion of cases in this age group ranges from less than 12 percent among white males to more than 34 percent among nonwhite females. Females of both races have a higher proportion of cases in per-

sons under 20 years of age than do males, and for each sex, the rate for nonwhites is higher than the rate for whites. This is true for every State as well as for the Nation as a whole. Table 2 shows the percentage of infectious venereal disease cases for males and for females under age 20 for each of the 47 States participating in the study. Wide ranges occur between States, and percentages for all teen-agers vary from 9.6 percent to 33.9 percent.

Figure 4 presents the percentage of infectious venereal disease among persons under 20 years of age in the various States. It shows that the greater proportions by and large coincide with the States having the greater total venereal disease problems. These States have characteristically operated vigorous control programs

during the past decade, but their socioeconomic levels and the age and race distributions of their populations have placed them in a relatively unfavorable, although improving, situation with respect to most health problems. The high percentages of venereal disease among teen-agers in these areas are therefore a valid measure of how far the venereal disease control programs in these States have yet to go before the venereal disease aspect of their total youth problem compares favorably with that of States having low percentages of infectious venereal disease among their youth. We have used this percentage of infectious venereal disease among persons under 20 years of age as an index of the venereal disease problem among teen-agers, and we have related it to other problems of youth.

Table 1. Cases of primary and secondary syphilis and gonorrhea reported in continental United States, calendar year 1953, by age

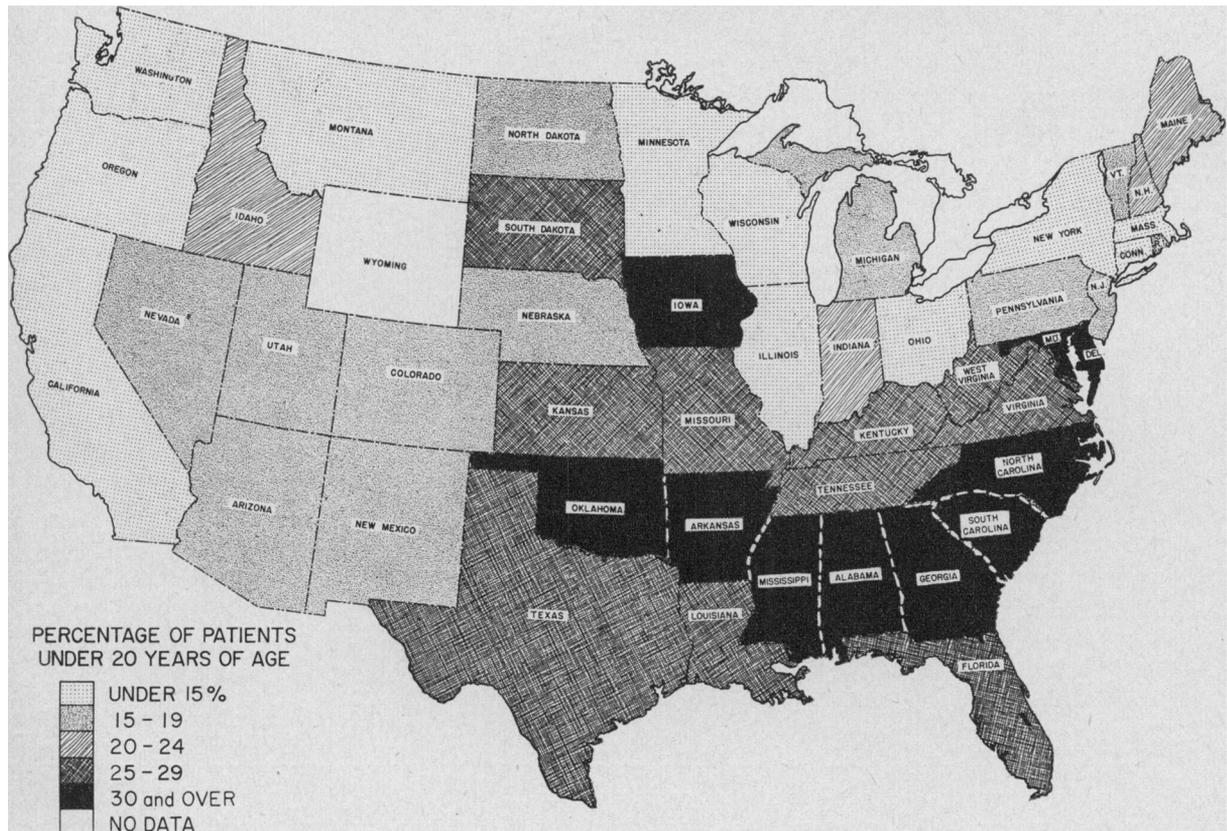
Age	Total syphilis and gonorrhea			Primary and secondary syphilis and gonorrhea			Percent primary and secondary syphilis and gonorrhea of total syphilis and gonorrhea
	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	
Less than 1	514	0.13	0.13	206	0.08	0.08	40.08
1	192	.05	.18	51	.02	.10	26.56
2	225	.06	.24	138	.06	.16	61.33
3	196	.05	.29	137	.06	.22	69.90
4	235	.06	.35	162	.07	.28	68.94
5	271	.07	.42	158	.06	.34	58.30
6	313	.08	.50	159	.06	.40	50.80
7	321	.08	.58	136	.06	.46	42.37
8	312	.08	.66	114	.05	.51	36.54
9	340	.09	.75	114	.05	.56	33.53
10	381	.10	.85	100	.04	.60	26.25
11	356	.09	.94	73	.03	.63	20.51
12	586	.15	1.09	200	.08	.71	34.13
13	1,085	.28	1.37	619	.25	.96	57.05
14	2,242	.58	1.95	1,612	.65	1.61	71.90
15	4,174	1.08	3.03	3,322	1.35	2.96	79.59
16	7,369	1.90	4.93	6,208	2.51	5.47	84.24
17	11,710	3.03	7.96	10,312	4.18	9.65	88.06
18	17,504	4.52	12.49	15,483	6.27	15.91	88.45
19	18,499	4.78	17.27	16,072	6.51	22.42	86.88
20-24	93,390	24.14	41.41	80,306	32.52	54.94	85.99
25-29	72,935	18.85	60.26	56,729	22.97	77.91	77.78
30-34	44,553	11.51	71.77	28,349	11.48	89.39	63.63
35-39	28,411	7.34	79.11	13,072	5.29	94.68	46.01
40-44	21,922	5.68	84.78	6,774	2.74	97.42	30.90
45-49	16,112	4.16	88.94	3,201	1.30	98.72	19.87
50-54	13,569	3.51	92.45	1,698	.69	99.40	12.51
55-59	9,924	2.56	95.02	753	.30	99.70	7.59
60-64	8,020	2.07	97.09	383	.16	99.86	4.78
65-69	6,045	1.56	98.65	216	.09	99.95	3.57
70-74	3,008	.78	99.43	86	.03	99.98	2.86
75-79	1,398	.36	99.79	27	.01	99.99	1.93
80+	801	.21	100.00	7	.00	100.00	.87
Total	386,913	100.00		246,977	100.00		63.83

Table 2. Percentage of all gonorrhea and primary and secondary syphilis cases reported among persons under 20 years of age by State

State	Male	Female	Total	State	Male	Female	Total
Connecticut	6.0	25.4	9.6	Wisconsin	8.8	25.2	13.6
Maine	13.3	48.8	23.7	Iowa	16.2	51.2	32.7
Massachusetts	5.7	25.1	10.9	Kansas	17.6	39.8	27.4
New Hampshire	0	42.1	20.0	Minnesota	7.2	20.9	11.2
Rhode Island	10.4	36.7	16.7	Missouri	20.1	37.3	25.8
Vermont	13.5	21.1	16.1	Nebraska	10.7	24.5	17.2
Delaware	26.5	50.0	33.9	North Dakota	N. D.	N. D.	18.5
New Jersey	12.3	29.6	17.3	South Dakota	27.0	42.2	28.1
New York	9.4	24.6	11.6	Arkansas	25.3	41.1	33.2
Pennsylvania	14.3	31.2	19.4	Louisiana	22.1	35.7	26.7
District of Columbia	N. D.	N. D.	N. D.	New Mexico	15.0	27.3	19.1
Kentucky	21.0	33.8	25.3	Oklahoma	24.0	40.0	31.7
Maryland	24.2	48.6	31.6	Texas	22.2	36.6	27.9
North Carolina	24.4	42.2	31.3	Colorado	9.2	24.1	15.6
Virginia	22.1	32.2	27.9	Idaho	12.4	35.9	22.3
West Virginia	17.6	38.9	29.4	Montana	3.4	25.0	11.3
Alabama	27.8	45.7	33.5	Utah	11.5	32.3	18.5
Florida	22.8	34.7	26.3	Wyoming	N. D.	N. D.	N. D.
Georgia	27.1	38.6	31.5	Arizona	15.3	32.6	19.1
Mississippi	24.4	39.2	30.0	California	9.8	25.1	14.1
South Carolina	25.2	42.2	30.5	Nevada	14.6	33.3	19.3
Tennessee	19.5	32.9	25.8	Oregon	6.0	31.5	12.7
Illinois	10.6	25.3	14.3	Washington	6.1	20.0	11.8
Indiana	15.7	38.8	23.0				
Michigan	16.3	24.5	19.7				
Ohio	10.0	23.5	14.1				

N. D.—No data.

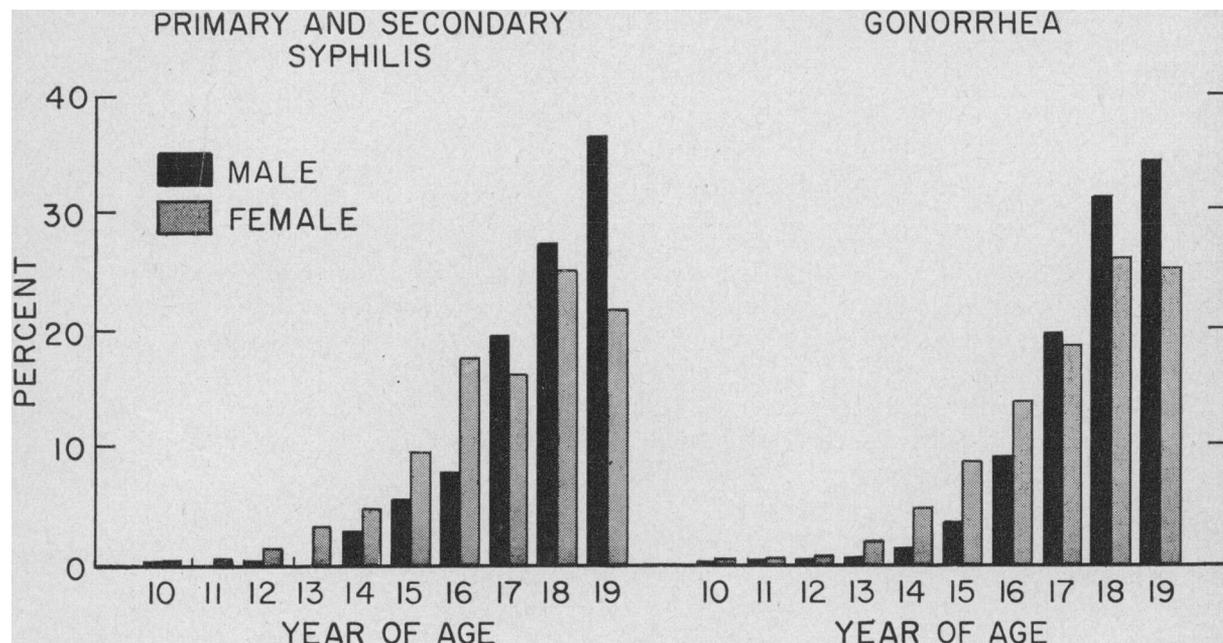
Figure 4. Infectious venereal disease among teen-agers in the United States.



Infectious venereal disease reported in persons 10–19 years of age is separated in figure 5 into its two components, primary and secondary syphilis and gonorrhea, in an effort to distinguish sexually acquired from nonsexually acquired infections. It will be observed that the age distribution for primary and secondary syphilis, which is rarely nonsexually acquired,

Table 3 and figure 6 show the cumulative percentages of infectious venereal disease cases in persons 10–19 years of age, by sex. Since there were no appreciable differences in the percentage distributions by race, these data were not shown separately by race. The cumulative percentage of infected females is higher than the cumulative percentage of infected males at

Figure 5. Percentage distribution of cases of primary and secondary syphilis and of gonorrhea reported among males and females aged 10–19 years.



is in general the same as for gonorrhea. In both diseases, the upward swing begins in females at age 12 and in males at age 14, and illustrates the point that infectious venereal disease is sexually acquired at a much earlier age than has been realized. Females have a higher proportion of cases than males in the earlier years up to age 17, at which age the percentage in males becomes higher than in females. As a matter of fact, the 18th year of age is the modal year for all females, whereas the male frequency continues to increase with age into the early twenties. The dip at age 17 among females with primary and secondary syphilis is not explainable unless females at that age claimed to be a year older than they were. This phenomenon does not appear in the gonorrhea distribution, however.

each age from 10 through 18 years. The greatest difference in cumulative percentage is at age 16 where the difference is 15.9 percent. The curves indicate that 50 percent of the females in the group 10–19 years of age become infected by the time they reach the age of 17.5 years whereas 50 percent of the males become infected by the time they reach the age of 18.0 years. The quartile horizontal line shows that 25 percent of the females are infected by age 16.1 years whereas one-fourth of the males become infected by age 17.0 years.

Charts 7–11 are scatter diagrams, which present a graphic picture of the association between infectious venereal disease among teen-agers and certain other problems of youth. The rate (or percentage) of infectious venereal disease cases among persons under 20 years of age in a

Table 3. Cases of infectious venereal disease reported among males and females aged 10–19 years

Age	Sex						Excess of female over male
	Male			Female			
	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Cumulative percent
10	16	0.08	0.08	58	0.28	0.28	0.20
11	15	.07	.15	48	.23	.51	.36
12	37	.18	.32	129	.62	1.12	.80
13	71	.34	.66	418	2.00	3.12	2.46
14	289	1.37	2.02	984	4.71	7.83	5.81
15	752	3.56	5.58	1,836	8.78	16.61	11.03
16	1,921	9.09	14.67	2,915	13.94	30.55	15.88
17	4,142	19.60	34.27	3,876	18.53	49.08	14.81
18	6,606	31.25	65.52	5,428	25.96	75.03	9.51
19	7,288	34.48	100.00	5,221	24.97	100.00	.00
Total	21,137	100.00		20,913	100.00		

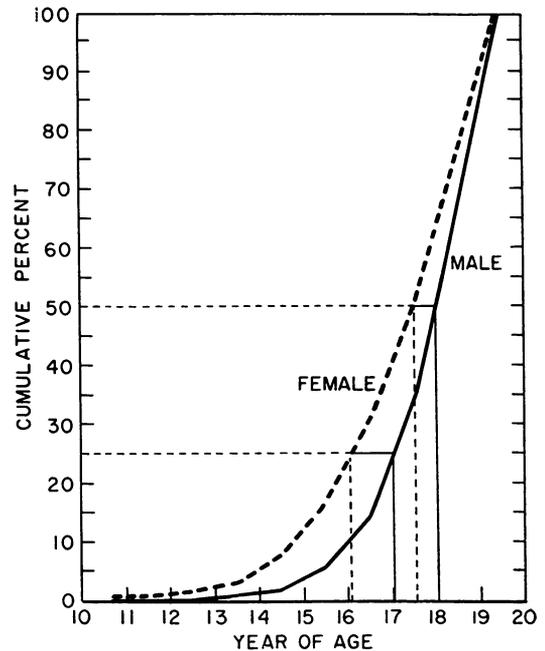
State is plotted on the X -axis, and the extent of other youth problems is plotted on the Y -axis. Each point represents a State for which measures of both variables are available.

It should be mentioned that a significant coefficient of correlation does not necessarily indicate a *causal* relationship but does illustrate that a definite association exists between two variables within the same segment of the population.

The degree of association between two series plotted as indicated above is calculated by the correlation method and is measured in relative terms by the coefficient of correlation which ranges in numerical value from 0 to ± 1 . A value of $+1$ would mean that there is a perfect direct relationship, that is, an increase in X results in a definite increase in Y . A value of $r = 0$ would indicate that there is no association whatsoever between the two variables, and a value of $r = -1$ would mean a perfect inverse relationship. Rarely would one expect to find such values of a coefficient correlation computed from actual data. The less perfect the relationship between the two variables, the greater the departures (or scatter) from the line of regression.

All correlations shown in this paper have been tested for statistical significance. All but one were significant at the 1-percent level, meaning that there is less than 1 chance out of 100 of finding such a degree of correlation by

Figure 6. Cumulative percentage distribution of infectious venereal disease reported among males and females aged 10–19 years.

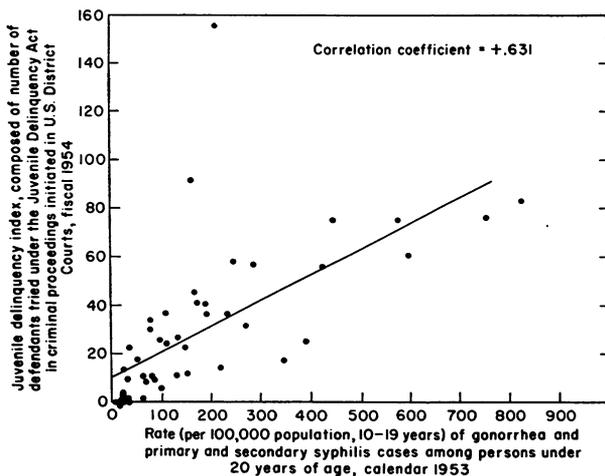


chance in unassociated data. The single exception is the correlation relating venereal disease and illegitimacy (fig. 8), which was significant at the 2-percent level.

It should be mentioned that there is a paucity of statistics on juvenile delinquency which are comparable from State to State. The problem

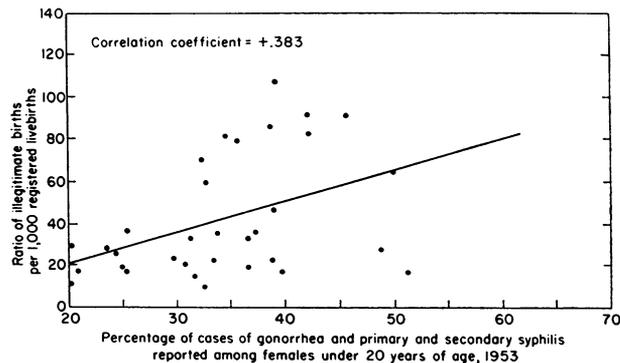
is that the laws and interpretations of laws concerning juvenile delinquency vary greatly between States. In fact, interpretations vary within States. Variable factors include age, sex, nature of crime, conditions in home, status of parents, intelligence of juvenile, education, probation, court procedures, and so on. Furthermore, there is no standard procedure for reporting juvenile delinquency statistics, and many States do not even have a central reporting agency for juvenile court statistics.

Figure 7. Scatter diagram relating infectious venereal diseases and juvenile delinquency reported by 47 States.



The only available data on juvenile delinquency which are statewide in coverage and which meet the criteria of consistency between States appear in the annual report of the Administrative Office of the United States Courts (1). The number of defendants in criminal proceedings tried under the Juvenile Delinquency Act (Title 18, sec. 5031) in the United States district courts is used as an index of juvenile delinquency in each State. Figure 7 shows the number of cases of infectious venereal disease per 100,000 population under 20 years of age in 47 States plotted against a juvenile delinquency index for each State, based on the number of defendants in criminal proceedings initiated in United States district courts during fiscal year 1954. The coefficient of correlation was equal to plus .631, which indicates a significant positive association between the infectious venereal disease rate among teen-agers and ju-

Figure 8. Scatter diagram relating infectious venereal disease and illegitimacy reported by 32 States.



venile delinquency as represented by the number of criminal proceedings for Federal offenses among the same age group population.

The dependent variables in the remaining figures are statistical data concerning problems of the same population segment as published by the National Office of Vital Statistics and the Census Bureau. In figure 8 the percentage of cases of infectious venereal disease among females under 20 years of age is plotted against the illegitimacy ratio reported in 32 States, which is used as a measure of promiscuity (2). The coefficient of correlation was equal to plus .383, which indicates a positive association between the percentage of infectious venereal disease among female teen-agers and the ratio of illegitimate births per 1,000 live births registered.

Figure 9 shows the percentage of cases of infectious venereal disease among females un-

Figure 9. Scatter diagram relating infectious venereal disease and fetal deaths reported by 46 States.

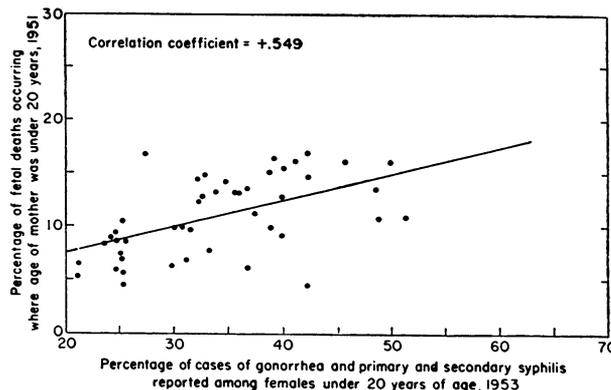
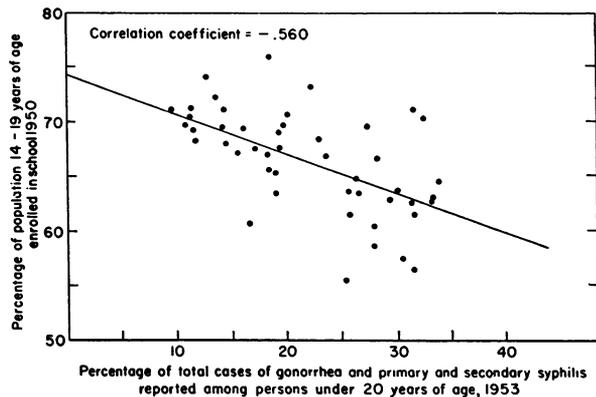


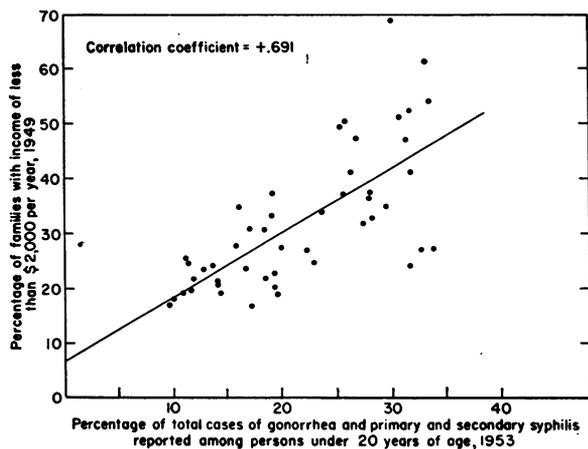
Figure 10. Scatter diagram relating infectious venereal disease and school enrollment reported by 47 States.



der 20 years of age plotted against the percentage of fetal deaths (abortions, miscarriages, and stillbirths) occurring among mothers under 20 years of age reported by 46 States (2). The coefficient of correlation was plus .549 and indicates that a significant association exists between venereal disease and fetal deaths among teen-age mothers. This does not mean that venereal disease necessarily caused the fetal deaths, although venereal disease among pregnant women can result in disastrous outcome.

The percentage of infectious venereal disease among persons under 20 years of age is plotted in figure 10 against the percentage of the population 14-19 years of age enrolled in school (3) in 47 States. The coefficient of correlation was minus .560, which indicates a significant inverse

Figure 11. Scatter diagram relating infectious venereal disease and extent of low family income, reported by 47 States.



relationship between percentage of school enrollment and the percentage of infectious venereal disease among persons under 20 years of age. This negative association indicates that the higher the percentage of teen-agers in school the lower the venereal disease attack rate among this age group.

Figure 11 shows the percentage of total cases of gonorrhea and primary and secondary syphilis reported among persons under 20 years of age plotted against the percentage of families with incomes of less than \$2,000 per year (3). The coefficient of correlation was plus .691 and indicates that there exists a significant positive association between venereal disease and this measure of financial status. This should be expected since it is well known that the lower the socioeconomic level the higher the venereal disease rate.

Discussion

All the evidence presented points to the fact that there is a definite degree of association between teen-age venereal disease and other problems of youth. The extent of venereal disease among teen-agers varies directly with criminal proceedings for Federal offenses among the same age group, promiscuity among persons under 20 years of age, fetal deaths among teen-age mothers, and lack of financial stability and varies inversely with educational status. This latter point is the one encouraging aspect of the problem since the higher percentage of juveniles enrolled in school, the lower the venereal disease attack rate in this age group.

The meaning of venereal disease among teen-agers might be interpreted in several ways. It could be argued that in a country where there is considerable incidence of infectious venereal disease, it is only natural that sexually active teen-agers account for a substantial proportion of all venereal infections. On the other hand, a youngster infected with a venereal disease has obviously deviated from the accepted pattern of approved social behavior. In this sense, venereal disease itself might be considered a manifestation of the broad problem of juvenile delinquency.

These correlations highlight again an im-

portant phase of the Nation's prospects in the field of health: The protection which adequate income, wise and well-organized communities, and familial and social guidance can give to our American youth has indirect benefits in the field of health. The correlations indicate that venereal disease is but one of the problems to which our less-protected and therefore less-privileged youth is exposed.

Current indications of increases of venereal disease in many States, recent outbreaks of venereal disease involving high percentages of teen-agers, and the extensive juvenile delinquency which has recently been of so much general concern highlight the serious problem which exists in our venereal disease control program and to which our utmost efforts must now be directed.

That the venereal disease program, as well as other health programs, was able during the last decade to make headway in the presence of other youth problems arises largely from the fact that the techniques of case finding, diagnosis, and treatment, vigorously supported with

local, State, and Federal funds, acquired a momentum greater than the speed at which these diseases were transmitted. This reduction in incidence and prevalence of venereal diseases among teen-agers might be envisioned not only as a specific accomplishment in disease control but as part of our total effort toward giving youth protection against the many hazards of growing up; as part of the Nation's effort to create a favorable climate and soil for its most important product.

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Legal Note on Commitment of Insane Federal Prisoners

The United States Court of Appeals for the Eighth Circuit, in an opinion dated February 14, 1955, held that any insane or mentally incompetent Federal prisoner may be committed to the custody of the Attorney General regardless of the probable duration of his illness, *Greenwood v. United States*, 23 U. S. L. Week 2411.

This decision is in conflict with prior cases from two other circuits, the 9th and 10th. In the cases of *Wells v. Attorney General*, 201 F. 2d 556 (C. C. A. 9th, 1953), and *Higgins v. United States*, 205 F. 2d 650 (C. C. A. 10th, 1953) it was held that such commitments must be limited to temporarily insane prisoners pending their trial since any attempt by Congress to authorize the commitment of other than temporarily insane prisoners would be

unconstitutional as an invasion of the general field of lunacy which is reserved to the States by the 10th amendment. The *Wells v. Attorney General* case was noted in the August 1953 issue of *Public Health Reports*, page 825.

In the *Greenwood* case, however, the court held that the power to provide for the commitment of insane or incompetent prisoners to the custody of the Attorney General was a necessary incident to the power to provide for the enforcement of the Federal criminal laws. With regard to the invasion of the "general field of lunacy," the court said that: "No valid objection can be based upon the fact that such exercise may be attended by the same incidents which attend the exercise by a State of its police power, or that it may tend to accomplish a similar purpose."